

In the final chapter causes of change in specific characters are classified (chemical, mechanical, light, heat, &c.), and finally a valuable discussion is given of the three chief hypotheses of specific change—germinal variation, transmission of somatic acquirements, and parallel effects of environment on soma and germ. The arguments for and against each are set forth in tabular form, and it is concluded that few, if any, observed facts are inconsistent with the third hypothesis, while it has important experimental and circumstantial evidence in its favour.

L. D.

REFERENCE BOOKS OF BIOCHEMISTRY.

Biochemisches Handlexikon. Herausgegeben von Prof. Emil Abderhalden.

iv. Band, 1 Hälfte: *Proteine der Pflanzenwelt, Proteine der Tierwelt, Peptone und Kyrine, Oxydative Abbanprodukte der Proteine, Polypeptide.* Pp. 352. Price 14 marks.

vii. Band, 1 Hälfte: *Gerbstoffe, Flechtenstoffe, Saponine, Bitterstoffe, Terpene.* Pp. 538. Price 22 marks.

(Berlin: J. Springer, 1910.)

THESE two books form the first halves of vols. iv. and vii. of a work in seven volumes on biochemistry, which is intended, as the editor states in the preface, to perform the same function for the biochemist as "Beilstein" does for the organic chemist.

Although the work is termed a hand-lexicon, the articles are arranged as monographs, and there is no discoverable system by which the reader may trace out any detail to which he may want to refer in any one of these long articles. There is no table of contents nor any index to help one, and in any well-regulated laboratory one might almost as well, so far as trouble is concerned, search out the original literature as refer to one of these articles.

For example, one of the best articles in the two half-volumes under review is that on the saponins by Prof. Kobert, of Rostock, occupying 84 pp., and describing nearly as many members of the group as there are pages in the article. There is no apparent method in the arrangement of the description of the members, and nothing to guide us as to where any particular member is to be found. It so happens that the writer is at present working at the biochemistry of an important and well-known saponin occurring in ivy-leaves, and therefore he looked keenly through these 84 pp. to see if there was anything new about it. The search was disappointing; after a long and weary hunt not one word was to be found in the whole article concerning it. This will never do in a work intended to be the biochemical rival of "Beilstein." In that work each volume carries its index, and it is to be hoped that purchasers of the present work will not have to wait longer than the appearance of the second halves of the volumes for the indispensable index.

The two half-volumes which have so far appeared form very dull, dry, and uninteresting reading even for a "Handlexikon," and lack the saving virtues of

a lexicon of completeness and ready accessibility to detail.

It would have been an improvement if the articles had been issued as separate monographs; and even then one might question why it was necessary to write some of them at all. Better monographs and more complete have been compiled by other writers in several of the subjects, and are well known and accessible to all workers in biochemistry; and in certain of the others the subject of the monograph is interesting to such a small circle of readers only that it might still be allowed to rest in the original archives, where the half-dozen workers on the subject know quite well where to find the papers they require.

One wonders how many readers will take any deep interest in the wonderfully detailed article of 112 pp. from the pen of Dr. O. Hesse on "Die Flechtenstoffe," under which title, the author informs us at the outset, we are to understand "organic compounds which occur only in the 'Flechten' or lichens, and accordingly are peculiar to these plants." Again, of the very few who have the requisite special training to struggle through Dr. Hesse's article, how many will ever require in the entire course of their lifetime any of the wondrous detail of Dr. Kobert's article on saponins coming immediately after it? There is certainly a deep and abiding comfort in thinking upon the amount of human lore in complete ignorance of which one can pass happily and successfully through this mortal life.

Turning to the articles in the two half-volumes which interest a wider circle of readers, such as those in vol. iv., first part, on the vegetable and animal proteins, their hydrolytic and oxidative products, and the polypeptides, these may be described as somewhat more useful, although the cast-iron form into which they are thrown robs them of much of their interest. One becomes somewhat fatigued by the continuous repetition in mournful, broad-faced type of *Vorkommen, Darstellung, Bestimmung, Koagulations-temperatur, physikalische und chemische Eigenschaften, physiologische Eigenschaften, u.s.w.* If the monograph form is to be selected for a hand-lexicon, why not give some freedom to the authors to throw the matter into their own form and style, and so infuse some life into what they are writing, instead of dissecting it out in this way like a dead body? An index to each monograph would easily give orientation to anyone looking for a special detail. The cast-iron plan pursued in the present work, moreover, loses space instead of gaining it by continued reiteration of the same facts for each member of a many-membered class. For example, the actions of the digestive juices upon polypeptides could be given in tabular form in a space of one or two pages by putting the whole thing connectedly and together; instead of this, practically the same statements are repeated in describing each member of the legion of polypeptides. Again, in the article on the saponins, the reaction of each individual to the generic colour-test with concentrated sulphuric acid is given with tiresome repetition, as well as many other matters of

a general character, all of which, it may be remarked, have in this article already been given in an introductory description of general properties of the group.

Apart from details, nearly all the articles which deal with subjects of general interest will be found to present a well-known and familiar appearance to the biochemist. Any laboratory which possesses E. Fischer's work on the amino-acids and polypeptides can have little service for the present monograph on the same subject in this series. The article on the vegetable proteins in the "Biochemischen Arbeitsmethoden," written by the same author, edited by the same editor, and issued by the same publishing house (reviewed in NATURE a few months ago), takes much of the wind out of the sails of the article on the "Proteine der Pflanzenwelt" in the present colossal work, which is appearing simultaneously with the equally colossal "Handbuch der biochemischen Arbeitsmethoden" under Prof. Emil Abderhalden's guidance.

There would appear to be a paying market for any large work on chemistry issued in Germany, for that country seems to have become the world's factory for this type of literature, and of all German editors Prof. Emil Abderhalden seems to be the most prolific, as witness the twin works, each of about seven volumes, and each volume so fat that it becomes itself a twin, issuing at the same time under his editorship. But one occasionally feels there can be too much of this thing, and is inclined to cry out, "Halt, halt; we must work as well as read," and spend our money, at least in part, upon materials and equipment for our laboratories, which bid fair to be starved by too much cooking for our libraries.

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METABOLISM OF PLANTS.

Der Stoffwechsel der Pflanzen. By Prof. A. Nathansohn. Pp. viii+472. (Leipzig: Quelle and Meyer, 1910.) Price 12 marks.

THE great advances that have been made in recent years in research into the leading principles and fundamental facts of the physiology of plants have made it necessary to specialise in particular directions, and the literature of the subject shows in consequence a tendency to deal with two aspects of the general life of plants almost entirely apart from one another. Of these the first embraces the phenomena of the individual life; the second, the relations of the individual to the conditions of its environment. In the present volume Dr. Nathansohn has undertaken to deal almost exclusively with the former of these problems, and has set before himself the task of discussing the present position of the metabolic phenomena characteristic of the green plant. The book is not intended to displace the standard text-books on the subject, but to deal more exhaustively than is possible in the latter with the gradual unfolding of knowledge and the gathering together of the mass of detail which has been accumulating for the past decade or longer.

In pursuance of this design he has dealt with his

subject in eight sections, following the general line of treatment of his predecessors. Beginning with the absorption of material from the soil and the atmosphere, he deals with the construction and management of foods, certain problems of nutrition, immediate and deferred, respiration and the regulation of energy, and the phenomena of secretion and excretion.

The discussion of the first of these questions, involving the absorption and transport of water, involves the examination of many physical and chemical questions, which are ably handled, with a due avoidance of dogmatism. The author introduces the second problem with a historical summary of the earlier work on the question of photosynthesis, or, as he prefers to call it, carbon dioxide assimilation. It is a little disappointing to find him almost stopping short here with the researches of the Sachsian period, and dealing very briefly with the result of later investigations. His treatment of the metabolic processes and phenomena in which non-nitrogenous substances are concerned leads one to regret that while the sugars are dealt with at great length, he has very little to say about the glucosides, inulin, and the celluloses. The metabolic phenomena in which these are concerned are of considerable importance, and a graphic presentation of them is just now much to be desired. In his treatment of nitrogenous substances, too, Dr. Nathansohn has dealt at some length with the proteins, giving them, as is natural, a position commensurate with their importance in metabolism; but he leaves us wishing he had devoted more space to such bodies as the alkaloids, which he dismisses somewhat briefly.

While appreciating the great amount of valuable material which the book contains, the English reader will be struck with particular deficiencies. The point of view leaves something to be desired. The book treats of the plant as a machine rather than as a living organism. No doubt it is a machine, but it is much more than that; it is capable of regulating all its chemical and physical processes according to its requirements from time to time and to the variation of external conditions. The part played by the living substance in the various changes and rearrangements that constitute metabolism is only too easily lost sight of. It is especially necessary to emphasise this fact, particularly in the discussion of the respiratory phenomena, or one might suppose that the respiratory interchanges take place for the most part without any involvement of the protoplasm, as if sugars, or fats, or what not, are oxidised in the cell by direct action of oxygen upon them. The fact that respiration is an indication of profound auto-decomposition and reconstruction of the protoplasmic molecule might have been made more impressive to the reader of the chapters which deal with this subject.

Another feature which is very remarkable is the narrow range of literature which the author quotes. Out of a total of some 450 references, a bare dozen or so are English, and scarcely more than a score are French. The English reader will certainly regret the very scant attention that has been paid to Eng-